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SWIMMING, DIVING,

AND

HOW TO SAVE LIFE.

BY

WILLIAM WILSON,

Club-Master to the Victoria Baths Company, Glasgow.
Late of the Arlington Swimming Club.
Chairman, Associated Swimming Clubs of Scotland, &c.

ILLUSTRATED WITH FULL-PAGE ENGRAVINGS,

Drawn from Life by Alex. Davidson.

GLASGOW:
KERR & RICHARDSON, 80 QUEEN STREET.
1876.

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TO

WILLIAM WILSON, ESQ.,

OF WEST LODGE, POLLOKSHIELDS,

WHO SO LIBERALLY ENCOURAGES EVERYTHING TENDING TO ADVANCE THE ART OF SWIMMING; AND WHOSE UNTIRING EFFORTS DURING THE LAST TEN YEARS, TO ESTABLISH PUBLIC BATHS IN THE CITY OF GLASGOW HAVE BEEN CROWNED WITH SUCCESS,

THIS BOOK IS INSCRIBED,

BY HIS DEVOTED SERVANT,

THE AUTHOR.

GLASGOW, *1st July*, 1876.

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INTRODUCTION.

MANY good swimmers naturally have a great desire to impart a knowledge of the art to others less favoured than themselves, but find that they cannot do so for want of a proper system. Numerous instances might be mentioned of heads of families, themselves tolerably good swimmers, who have been particularly anxious that their children should possess a knowledge of this highly useful art, and who have themselves tried to communicate this knowledge, but have been either only partially successful, or after many trials have had reluctantly to give up the task.

The object, therefore, of the present writer is to afford some plain instructions, which it is intended shall be more easily understood and practised than the sometimes too elaborate lessons which are given

in books purporting to make the art of swimming easy.

There are, no doubt, many persons who both can and do learn without a teacher, but there are others who struggle on for indefinite lengths of time, without making the slightest progress, and to these latter, as well as to the former, the lessons now proposed to be given will, it is hoped, be of real benefit, as the movements will be so explained in detail that almost any one may understand, and with some attention and patience teach them.

The initiatory lesson will be given in as few words as possible, and followed by explanations of the improved methods of swimming now in practice. This, the writer trusts, will be of service to old and young swimmers alike. The chapter on Bathing will, it is also hoped, prove of advantage.

BATHING.

THE COLD, TEPID, HOT, VAPOUR, AND TURKISH BATHS.

No matter to what particular branch of physical education one may direct his attention, or whether he may practise with each separate apparatus of the perfectly furnished gymnasium, he must, to give his exercises justice, have constant recourse to the bath, be it hot, tepid, or cold; not only on account of its sanitary effects, but also for its peculiar hygienic benefits: the former of course promoting the latter.

General and partial ablution of the body was an important part of the Mosaic Dispensation, and this was apparently meant to encourage cleanliness, at a time when leprosy and other diseases of the skin were prevalent, for we find that the Scriptures mention bathing as a remedy or cure for disease.

"Cleanliness is next to Godliness"; and whether Christian or Sceptic, every one intuitively feels that it is a duty he owes to society and himself, if not to the Creator, to keep his body clean. Urquhart says, "that the habit of bathing, by rendering us more cleanly, will give us greater strength of muscle, greater powers of endurance, greater immunity from disease, greater facilities in recovering health, a longer term of life, more equanimity of mind, less desire for foreign stimulants, whether physical or mental, which will bring with it a larger share of self-respect and diminish those sources of disrespect to which we may be exposed from others." Personal cleanliness is a complete sanitary reformer, for we invariably find that the person who keeps his own body clean, is particular to have his surroundings free from dirt.

In history, bathing seems to indicate progress in the direction of civilization and refinement, and is nearly always confined to the polished nations of Europe and Asia.

Only by water, hot air, and vapour, can we attain this, and we therefore betake ourselves to the bath

for refreshment and health, purification, and invigoration.

The bath has, however, like everything else, on many occasions been abused. Care must therefore be taken lest over-indulgence should lead to bad results, as was the case with the ancient Romans, whose baths were of the most gorgeous description, but were ultimately resorted to more for luxury than for any healthful effects, and in the end were so much indulged in as to enervate and enfeeble the people.

Those who wish to bathe regularly, and benefit by the habit, should take a COLD or TEPID BATH every morning before breakfast, at a temperature between 55° and 70° F., the immersion in which should not last longer than from one or two to five minutes, unless in the exercise of swimming, when the stay in the water may be prolonged to twice or thrice that length of time.

Grecian athletes, when training for their most important contests, went into the cold bath in the morning for the purpose of bracing the sinews, and inuring the body to greater fatigue and exertion. The cold or tepid bath may be varied once a week

with a HOT BATH, at a temperature of 98° or 100° F., when the stay in the water should be prolonged to not less than twenty or thirty minutes. Should the bather leave the hot bath too soon, or before perspiration has exhausted itself, sweating will again break out, and a chill might follow. If the bather discovers he has come out of the warm water too soon, let him have a dip in quite cold water, or take plenty of the cold spray or shower, so that the pores may be closed before going out to the open air.

After violent exercise of any kind, a cold spray, or shower, or douche, will be found to be very refreshing. Many persons use the spray or shower immediately before going to bed, the effect of which is that it produces a calm and refreshing sleep.

The VAPOUR BATH is of great service in preventing the serious consequences of cold. If taken soon after feeling a chill, it prevents what would be almost sure to follow, namely,—headache, catarrh, bronchitis, diarrhœa, rheumatism, feverishness, or almost any of the many diseases which have their origin in cold.

The Vapour Bath may be medicated, and is

employed with success in cases of chronic and cutaneous diseases of the skin.

The TURKISH BATH is worthy of high commendation, and is becoming more popular year by year. It is the only means whereby the body can be thoroughly cleaned. It reaches beyond the surface of the body, purifying the millions of pores which form the skin. In the usual course of living these pores become clogged up, and nothing but copious perspiration can send out the particles that fill up these apertures which form the channels through which effete matter passing from the blood should escape. With some people an impression prevails that the profuse perspiration caused by the Turkish Bath must be weakening, but Mr. Urquhart, in his "Manual of the Turkish Bath," says that "no substance goes out from the body by perspiration except the noxious matter that ought to be got rid of."

Anyone whose occupation is of a sedentary nature, or whose mode of living is luxurious, will find the Turkish Bath a great boon. It controls and regulates, and diminishes and abstracts that which has been taken in excess, so that while the old matter

is being taken away by the bath, room is provided for the good and wholesome nourishment which is being supplied by the stomach. The Turkish Bath is of immense benefit in cases of colds, catarrh, hoarseness, sore-throat, and in pulmonary diseases; also, in biliousness, gout, neuralgia, paralysis, and rheumatism. Its efficacy has many times been proven in cases of fever, cholera, diarrhœa, dysentery, scrofula, and diseases of the skin. It has likewise been known, when taken in the early stages of consumption, to produce a complete cure.

The HOT-AIR BATH, combined with the process of shampooing, is effectual in removing, almost at once, aching pains in the bones and muscles, which have been the result of exertion or of cold, and it is incontestably as valuable a remedy in many diseases as it is a luxury, and a means of training in health.

The WARM SALT WATER BATH is strongly recommended to invalids for its strengthening and stimulating effects, as well as for the tone which it gives to the system.

THE SWIMMING BATH.

The eminent Dr. Abernethy says, "The Swimming Bath ranks among the foremost of the necessities and supports of life. It is of far higher consequence and of more general utility than any other kind of manual exercise, gymnastic or sport. It affects the system more powerfully than these, even in the very points wherein their excellency consists, and is applicable in a thousand ways where they are not. It does not supersede, but ought to come before, these other practices. Time should be, therefore, found for the bath among the regular occupations of life; it ought to be a permanent institution, ranking immediately after the prime necessities of our being. Either daily or several times a week should every one repair to it, in some shape or other, either at morning, mid-day, or evening, according to strength and leisure. There certainly does not exist a greater device in the art

of living, or a greater instrument for securing a vigorous and buoyant existence."

No one can relish a bath with the same keen sense of enjoyment as the swimmer—none but swimmers can have the full use and benefit of a plunge in the yielding element; and to give swimming its full healthful effects, it is best to practise it in the open air, and not only in the summer time, but during the winter months as well.

The writer has the acquaintance of several gentlemen who bathe in the open air every morning the whole year round, the appearance of whose faces speaks volumes in favour of the morning dip.

To swim in the sea is much easier, as far as buoyancy is concerned, than to swim in fresh water, on account of the greater density of the salt water; and as sea or salt water evaporates with less rapidity, the bather is not so apt to feel the body cold even after a prolonged stay. Reaction takes place quicker, and with a much more healthy result, than is the case after fresh water bathing.

To the experienced swimmer nothing can excel the pleasures of a swim in the sea when the water is tolerably rough. The bather's feelings are elated,

the swim acts like a stimulant, and the action of the sun's warm rays on the skin, on emerging from the water, adds to the keen sense of contentment. With one's feet on the warm rock or sand, the sun shining overhead and a comfortable breeze blowing, the "air bath" is enjoyed with relish.

Nor is this comfortable feeling a transient enjoyment, it lasts all day; the appetite is whetted, a hearty meal follows, and elasticity of body and mind continue till bedtime. If cheerful spirits help the body, and who will gainsay that they do? the swimmer who can practise at the sea coast must enjoy his share of health.

The exercise of Swimming develops the body; for in its practice the muscles of the legs, arms, chest, and shoulders, which are used on no other occasion, are actively employed. It expands the chest, strengthening the lungs, and is of the greatest service in warding off, and in some cases curing, pulmonary diseases.

From ancient history we learn that the inhabitants of Sparta acquired much of their strength and vigour through frequently plunging into the waves of the Eurotas, which ran through Peloponnesus and

the Lacedæmonian States, and washed the walls of Sparta; and no Spartan plunged into the waves of the river Eurotas who was unable to swim.

The Roman youths also practised swimming, as part of the exercises in the *Campus Martius;* the swimming-race generally took place immediately after the foot-running. The athletes finishing the foot-race on the banks of the river Tiber, plunged headlong into the water; after having the body anointed with oils, they had then to cross the river twice, before the contest was finished.

Of a truth, Swimming should form part of the education of every boy and girl, not only as a healthy and lively accomplishment, but also from motives of prudence and safety. Why should the women of this country not enjoy the privilege of indulging in such an exercise, and thus be in the possession of that which would enable them more practically to understand the first law of nature, self-preservation, and know how to save their own lives in cases of accidental immersion?

Ladies have not the advantage of many physical exercises beyond those of dancing, riding, skating, and rowing, and in the two last mentioned

they are nearly helpless, and entirely dependent on the exertions of others, in the event of an accident.

In view of these considerations, it can scarcely be flattering to the humane feelings, and proverbial dignity and heroism of the ladies of Britain, that greater opportunities are not afforded them for the learning and practice of this most useful of all accomplishments.

Now that some of the School Boards have taken the matter up, and all are becoming alive to the fact that intellectual and physical exercises should come together more than has hitherto been the case, let us hope the time is near indeed when the boys and girls of our country will deem it derogatory to their dignity to have to acknowledge that they are unable to swim and dive.

WHEN TO SWIM.

Let the learner choose for his first lesson a warm day about noon; during any part of the season, if in a bath. If in the open air, between the months of June and August, or, if he be of a robust constitution, he may bathe in the morning shortly after rising, having partaken of a dry biscuit, or, in the evening, not later than, say, eight o'clock.

In no case should any one enter water sooner after meals than seventy-five or eighty minutes, as bathing in cold or tepid water impedes digestion.

Neither should anyone enter water with the intention of having a long swim when the body is perspiring profusely, the result of great muscular exertion. The opposite extreme is as bad. No one can hope to enjoy a swim in cold water if he has to enter it when the body is chilled.

Swimming in quite cold water, after having been up all night, or after toil, fatigue, travelling, or in-

temperance, is to be avoided, as the body at these times is not sufficiently strong to produce the necessary reaction. Instead of swimming at such times, it would be advisable to have a tepid bath at about 80°, the effects of which would be to freshen and invigorate.

HOW LONG TO STAY IN THE WATER.

To practise Swimming with a view to benefit by its healthful effects, the stay in the water should not be prolonged beyond from ten to twenty minutes. Enthusiastic swimmers as a rule do stay longer in the water than this. They enjoy the practice and pleasure of rolling in the favourite element when they are in it, and they forget the evil effects which are almost sure to follow. The result is generally a debilitated feeling; the liveliness of spirit, and the healthy glow over the surface of the body has gone, and, instead of being refreshed and invigorated, one feels languid and sleepy; very often a disordered stomach, accompanied with headache, are the results. The body has given off so much heat that it has become too weak to produce that healthy reaction which is so pleasant and beneficial.

No doubt many instances have occurred tending to show how long one may remain in the water,

and still retain most of the ordinary functions of the human body. Notably, the late great exploit of Captain Matthew Webb, who, in his journey across the Straits of Dover, on the 24th and 25th of August, 1875, was immersed in the sea, with no covering or protection, for 23 hours 45½ minutes, the longest swim and immersion of which we have any authentic record. But it must be borne in mind that the heroic and plucky Captain, besides being possessed of extraordinary powers of endurance, had been in preparation for the great feat for more than twelve months prior to the date at which it took place.

In the usual course of things, however, one bathes for the sake of health, and in order that Swimming may be conducive to such an end, a short stay in the water is certainly to be recommended.

THE SWIMMING LESSON.

Having stated these preliminaries, the lesson may now be proceeded with; and the pupil must always bear in mind that to be successful there are three essentials, viz.:—

Confidence in the buoyancy of the body when the proper motions are made.

Presence of mind to think on, and perform the necessary movements.

Determination to learn.

Do not jump or dive from a height into the water, until accustomed to the slight shock experienced by learners. Walk quickly into the water until immersed to the middle of the body, turn the face to the shallow part, and duck the whole body and head by bending the knees, the one foot being behind the other. Have a friend to support the body, by means of a strap passed round the chest under the armpits, and meeting in the hollow

between the shoulders. This can be done best by the teacher leaning over the stern of a small punt. In this position he can see every portion of the pupil's limbs, and can direct the movements very easily without entering the water at all. Get the body into position, by throwing the head well forward, lift the feet off the ground, and stretch the legs as far apart as possible. This position of the nether limbs gives them floating power, and keeps them close to the surface of the water.

To make the lesson simple, there are three motions of legs and arms, which are numbered, and must be accurately performed as follows:—

With the arms—Bring the hands, with the palms close together, in front of the chest and directly under the chin, the fingers pointing straight in front.

At "one," stretch the arms out to their full extent in front, the palms still close together, and the hands about two inches under the surface of the water. *(See Fig. 1, Plate I.)*

At "two," separate the hands, and turn the wrists slightly until the hands are lying flat on the water; now brace the wrists, and, without bending the elbows, bring the arms slowly round, describing

with each a quarter circle, until hands, arms, and shoulders are in a straight line across. *(See Fig. 2, Plate I.)*

At "three," let the palms face towards the feet, and bring the hands in a straight line to the position whence they started. While this movement is being performed, the fingers should be pointing partly to the bottom of the pond, and, in a slanting direction, toward the front of one's own body. *(See Fig. 3, Plate I.)*

Practise these movements until they are performed accurately. Now keep the hands in the third position and practise the kick, before beginning which, bring the feet close up to the body, toes and knees of each foot and leg turned outward.

With the legs—At "one," kick the legs out to their full extent, as wide apart as possible. Be sure, when practising this part of the kick, to have the toes turned to the side outwards, and keep the ankles perfectly stiff. *(See Fig. 4, Plate II.)*

At "two," brace the knees, toes turned downward, and, without jerking, bring the legs neatly together, joint for joint. *(See Fig. 5, Plate II.)*

At "three," bring the feet close up to the body,

Fig. 3.

Fig. 1.

Fig. 2.

PLATE I.

the heels touching and the knees again turned to the side, the toes to be pointed sideways immediately the feet are close to the body. *(See Fig. 6, Plate II.)*

Practise these movements slowly, and distinctly separate, until each one is performed perfectly. Then begin the movements of arms and legs simultaneously as follows:—

At "one," put the arms out in front, and kick the legs wide apart. *(See Figs. 1 and 4.)*

At "two," bring the arms round, describing the quarter circle, at the same time pulling the legs together until they touch. *(See Figs. 2 and 5.)*

At "three," return the hands to the original position, and bring the heels close up to the body, knees and toes turned out. *(See Figs. 3 and 6.)*

Work with legs and arms in unison, slowly at first, and counting each movement. In a short time the motions will be performed quite mechanically, and, once they are learned, they are not easily forgotten.

FULLER DESCRIPTION OF THE MOVEMENTS.

The following hints in reference to the movements will be of some service to the advanced swimmer as well as to the learner:—

While performing the first part of the kick, be sure the legs are as wide as possible from each other, the effort being made to kick sideways and backward, *not downward.* The reasons for this are obvious. In the first place, kicking downward gives an ungainly jerk to the body, spoiling the appearance of the stroke, and is also a waste of strength, as it sends the body, or part of it, out of the water, while every effort should be made to propel the body *forward;* as the legs are kicked out, a slight movement of the ankle joint is performed, just enough to put toes and instep in a line with the front of the leg. This is done that the toes may cleave the water, opening a way for the

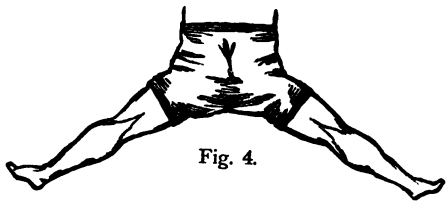

Fig. 4.

Fig. 5.

Fig. 6.

PLATE II.

foot, that there may be as little resistance as possible to its outward progress.

Number two of the kick is the most important motion of any, and, strange to say, the one most neglected by self-taught swimmers. It is actually the propelling power in swimming; for when the legs are brought firmly together, the body is shot forward;. therefore the wider the legs are kicked apart, and the firmer they are pulled together, the greater will be the speed attained. Mechanically speaking, when the legs have been kicked apart, the water between them is in form like a wedge or triangle, the apex being close to the body, and the base from heel to heel; as the feet are brought close together, the wedge so to speak, is driven out, and the force of the water closing behind it propels the body forward. Every swimmer should have this constantly in mind.

The motions one and two of the legs, should be performed in as nearly one movement as possible.

The instructions as to the movement of the ankle joint in number three, should be also borne in mind, as it is indispensable to perfection in swimming, and is done that there may be as little friction or

resistance as possible when the feet are being returned to renew the stroke. The toes are turned out again to allow of the feet being kicked apart with less waste of strength than could otherwise be the case.

Do not hitch the body in any way; the limbs must do all the work.

Keep the neck stiff, and make no effort, beyond the motion of arms and legs, to raise the head above the surface of the water. The weight of the head is diminished considerably when it rests on, or in the water. The body and legs should be level, the head being very slightly raised.

TO REGULATE THE BREATHING.

Many swimmers of long experience, and some even, who compete in swimming matches, as well as learners, find difficulty in regulating the breath. Now, there need be no more difficulty in breathing while swimming in the water than when walking on *terra firma.* It is as easy to breathe in the one as on the other, once the new sensations on learning it have been got over.

The fastest and best of our living swimmers have the mouth and nostrils immersed for at least two-thirds of the time they are swimming; this, along with the improved side stroke, and overhand swimming, accounts for the good time accomplished at swimming matches.

The swimmer on paying attention to the fact will find, that mouth and nostrils lie deepest at the beginning of the stroke, while they are raised above the surface, as the arms are brought round in the

second part of the movement. It will therefore be easily understood, that to breath regularly, he should exhale, or partly empty the lungs at "one." This is easily done although the mouth is under water. The lungs are then filled in an instant during the second part of the movement.

Be sure to *breathe regularly every stroke.*

Care must at first be taken until accustomed to the operation, not to open the mouth too soon for the purpose of inhalation, else water instead of air will be taken in.

The ordinary hap-hazard way of breathing spasmodically is a great mistake, and brings its own punishment. The swimmer on many occasions, instead of inhaling a supply of air, gulping down a mouthful of water, which causes gasping, splashing, and it may be sinking. Breathing with method and precision ensures comfort and confidence.

PRESENCE OF MIND.

Presence of mind, so necessary in all the duties of life, is essential to the swimmer. Instances might be given from personal knowledge, of good swimmers venturing too far from shore, and through looking at the distance they had gone and required to traverse before they could obtain a rest, becoming so paralyzed with fear, that they were only kept from sinking without an effort, by help being near. We have ourselves gone out to swimmers in this position, who without any further assistance than kindly words of encouragement, have yet been able to reach the point from which they started, and who have afterwards informed us, that without such encouragement they would have certainly gone down.

Let the swimmer always bear in mind the importance of presence of mind and calm deliberation in any trying position in the water. Let him remember, that no matter how tired he may be, by

simply turning on the back the slightest movement of arms or legs will support him on the surface of the water; or, let him take a long breath, expand the chest, keep the head well back and lie perfectly still, and he will thus have time to collect his thoughts, and consider what had best be done. In all likelihood he will by this time be sufficiently rested to resume his journey. One thing which all swimmers, especially when bathing in the sea, should guard against is, not to allow themselves to go too far out with the current when the tide is on the ebb. The best swimmer will find it hard work indeed to make headway against some currents.

THE SIDE STROKE.

The upholders of the good, plain, old-fashioned breast stroke, must now admit that, in point of speed, it has been quite superseded by the improved method of swimming on the side.

This mode of progression in the water is, however, not quite so modern as is commonly supposed. We find it mentioned in a book published so long ago as 1789, entitled the "Art of Swimming," and written by Monsieur Thevenot. The author describes it under the heading "To swim neither on back or belly," and gives as one of its recommendations, "that one side may rest, while the other is employed."

In July, 1840, Mr. Andrew Scott won the prize at a match on the Clyde at Glasgow, by swimming in the method just described, viz.,—first upon the one side, and then upon the other.

The swimmers of to-day would treat this changing from side to side for the purpose of resting as

absurd, because both legs and both arms are working equally hard, no matter on what side one is swimming.

The side stroke, properly so called, has been made a matter of careful practice for the past twenty years, until brought to perfection. And it is now a rare occurrence during the course of a fast swimming match, to see a competitor swimming for any length of time on the chest.

Before trying any of the side stroke movements the pupil will do well to be certain that he has attained precision, and as nearly as at all possible, perfection in the art of swimming on the chest. A good, well-executed breast stroke is faster, and more to be admired, than an indifferent side stroke. The improved stroke can never be successfully practised until a good kick has been attained on the chest. Many a learner, in his hurry to learn the side stroke, has acquired a style anything but graceful; and, once acquired, ungainly movements cannot be got rid of without a great deal of patience and hard work; while, if one masters the plain stroke thoroughly, the new movements will seem comparatively easy.

The advantages of the side stroke are, that the body, offering less friction or surface against the water, cleaves through it much more easily than when lying flat on the chest, a wider kick is obtained, and a double stroke, so to speak, is performed with the hands.

The pupil, when beginning, should accustom himself to the new position by inclining the side of the head to the water, and swimming his usual stroke. By degrees he may turn on the side, practising first the horizontal stroke with the one hand, and then the perpendicular movement with the other.

Some writers on the subject recommend lying on the left side, but this idea has now been discarded, and scientific swimmers agree, that to lie on the right side is preferable, for the reason, that a more effectual stroke can be made with the right or "cutwater" hand. The heart's action is also freer, and less impeded than could be the case were the swimmer lying on his left side.

The movements of the stroke in detail are as follows:—

Assuming the pupil to be lying on the right side, —let him begin by bringing the right, or undermost

hand up to the right shoulder, keep the hand flat, parallel with, and about two or three inches under the surface of the water, with the palm facing to the bottom of the pond, advance it in a straight line in front as far as it can be stretched, now scoop the hand, and strike downward, carrying it in a line with the body, until it reaches the midbody. (See the position of the undermost hand, *Plate IV.*, page 45.)

This is the positive, or propelling part of the stroke with the undermost hand, after which it is returned to the shoulder for the next stroke.

The uppermost, or left arm, is to be pulled along the front of the body, from the right shoulder to the top of the left hip, the elbow being kept bent the while. The negative part of the stroke is performed by returning the hand edgeways to the shoulder from which it started.

With the legs, bring both feet up to the body, heels touching, toes pointing outward, send the topmost or left foot, straight in front of and as nearly as possible at right angles to the body, at the same time kicking the undermost or right foot in the direction of one's own back. This motion of the legs seems like

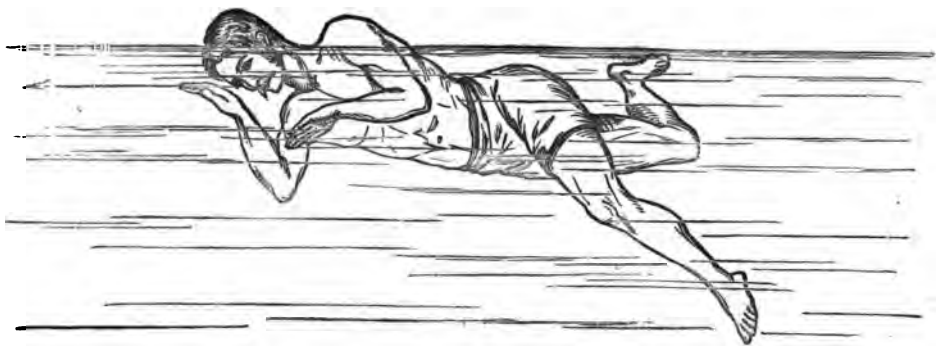

PLATE III.

a long stride, as in running; now bring the legs sharply together, the top or instep of the right foot, and the inner ankle of the left foot, offering the resisting surface. *(See Fig. in Plate III.)*

The movements of legs and arms are performed together thus:—Both hands start from the right shoulder. While the left hand is performing the positive part of the movement, the right arm is being stretched in front, at the same time the legs are kicked apart and pulled together in one movement; while the feet are being brought up to the body after having performed the positive part of the kick, the right hand is brought downward with a strong pull.

The neck should be kept firm, almost, but not quite rigid, that the head and face may be in one position, that is, with the chin resting on the scapula, between left shoulder and front of the chest. Instead of the face, as in the breast stroke, the top of the head now cleaves the water. The face being nearly all the time under the surface, the mouth comes above for an instant at the end of the positive movement with uppermost hand.

Should the pupil prefer swimming on the left

side, he must substitute in these instructions right for left, left for right, and so on.

Practise slowly, steadily, and perseveringly, There are many points in side swimming which can only be perfected by strict attention and constant practice.

The writer has seen the downward movement with the cutwater hand performed with such vigour and effect as to lift the swimmer forward nearly the length of his arm at each stroke. Especially is this noticeable in the swimming of Mr. J. B. Johnson, of Manchester, undoubtedly the finest swimmer who ever lived. Mr. Johnson seems at this part of the stroke to lift his body forward, with the same effect as if he had hold of a rod which was stationary, and, by a sudden movement, to pull his body right over it.

To regulate the breath when swimming on the side, inhale when the topmost hand has delivered the stroke and is being returned to the shoulder, and as the undermost hand is commencing the downward pull. Inhaling is done in an instant.

Exhale when the topmost hand is performing

the stroke in front of the body and the undermost hand is being returned for the stroke.

Particular attention must be paid to the breathing; as to swim on the side with any amount of success, the head and face will be under water at least two-thirds of the whole time when swimming.

Make no attempt to change from side to side; to obtain mechanical precision in the movements of each hand, arm, and leg, it is necessary to practise at all times the particular parts of the stroke with whatever set of limbs have been trained to the work.

THE OVERHAND STROKE.

The increase of speed attained by means of this latest and most approved method of propulsion is fully demonstrated by the fact that for some years past it has been generally adopted by the best English prize swimmers. By its use the fastest swimming on record has been performed at all distances, from 100 yards to two miles. Why it has not become more general in Scotland is beyond comprehension.

Some controversy has taken place as to who was the first to practise this stroke with anything like success.

Harry Gardner, of London, it appears, used it so long ago as 1855, having in that year won a silver medal at a swimming match in the Lambeth Baths, London. Certain it is that he was the first to win a race of any importance swimming overhand, having between August, 1862, and the same month, 1864,

held the 500 yards Manchester challenge cup, beating among others such fine swimmers as Aspinal, Mather, and Meakin.

Harry Gurr, of London, further proved the efficacy of the stroke by having, on the 22nd July, 1863, won the first race for Sir William Fraser's gold medal, distance 1 mile, against 22 competitors, on the river Thames. He also won, on the 5th September, 1864, the first race for the 2 miles champion cup, and held it the stipulated time, when it became his own property.

The apparent ease and grace with which this stroke may be practised is fully exemplified in the swimming of Dave Pamplin, of London, who is justly entitled to be called the most graceful swimmer who ever entered water. He cleaves through the water almost noiselessly, like an arrow discharged from a bow, leaving scarcely a ripple behind him. His uppermost hand is lifted swiftly and quietly out of the water, and again dipped without a splash.

The overhand stroke has been further improved by J. B. Johnson, who has added to the length of the reach forward with both hands. Particu-

larly is this noticeable in the uppermost arm. Each particular movement of arms and legs has been made a matter of careful study, and the result is that all his limbs work with mechanical precision and neatness. This, combined with his great muscular development, and staying powers, place him first as an exponent of the art of natation; and to him must be accorded the honour and credit of having brought the overhand stroke to its present high state of perfection.

It is admitted that this method is as much superior to the side stroke, with hands under water, as the side stroke was years ago to flat swimming. The motions of legs and undermost hand are similar to those performed when practising the side stroke. The characteristics of the new method are, that the topmost hand, immediately it has delivered the stroke in front of the body, instead of being returned to the shoulder under, is lifted gracefully out of, and carried along above the surface of the water, and then stretched as far as the hand can reach, beyond and in front of the head, in the direction of progress. *(See Fig. in Plate IV.)* The hand is then dipped without splashing and pulled strongly

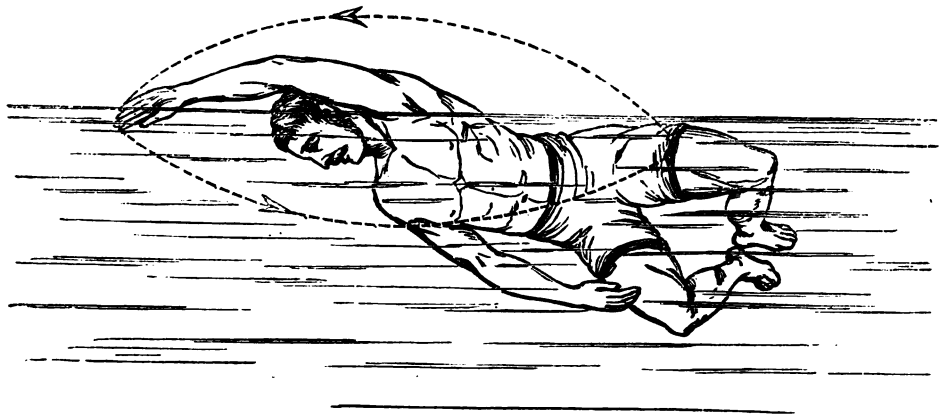

PLATE IV.

along the body, performing the positive part of the stroke.

The muscles of arms and shoulders should be relaxed at every stroke. By this means a rest is afforded them, and when the muscles are again set for the propelling part of the movement, they are of course stronger and capable of greater exertion than could otherwise be the case. One of the advantages not to be overlooked in this stroke is that when the uppermost arm is thrown forward, it has a long reach, and is carried with a springy motion, thus adding momentum to the onward progress.

The fact that head and face are wholly immersed for three-fourths of the time diminishes the weight, and consequently increases the speed. The mouth will be just clear of the surface when the hand is being carried out of the water. This therefore is the time to inhale. Exhale through the nostrils when the hand is being pulled along the body. Be particular to rinse the mouth, gargle the throat, and have all the air passages quite clear before entering the water, especially if going in for a trial of speed.

SWIMMING ON THE BACK.

This style of progression in the water is useful to the swimmer in many circumstances in which he may find himself. It is of benefit as a means of resting, and in case of cramp; and it is also of the greatest service in cases of rescue, as will be shown in the chapter devoted to that part of the subject; while to learn it is as easy as it may afterwards be found to be useful. Many pupils learn to swim on the back before making any progress at all in the ordinary stroke.

A certain amount of confidence is necessary for the first trial; and the learner need not be afraid to lay himself well out on his back in the water. The first inclination is to crouch, and draw the legs up; now the pupil should remember that immediately the limbs are drawn up, and the body bent forward, the chest becomes contracted, air is expelled from the lungs, the centre of gravity is destroyed, and

naturally the body will sink. The learner must therefore make up his mind to stretch the legs well out, lean the head back, expand the chest, and hollow the back, put the hands on the waist, kick slowly, steadily, and with precision, the same in every detail as in ordinary swimming, that is, when kicking wide to clip the legs together, and finish the movement by bringing the feet up to the body, turning the knees and toes outward when so doing.

Be careful not to bring the weight of the knees on the body, else that will cause it to sink; do not kick downward, nor hitch the body in any way.

It will become apparent to the pupil that strong or vigorous movements can be more easily dispensed with while on the back than with any of the other branches of swimming. At first the movement must be performed gently, the slightest motion of the legs, when neatly done, will sustain and at the same time propel the body. This is known as the plain back stroke.

ANOTHER METHOD, by which greater speed can be attained, is performed by using the hands and arms as propelling power, as follows:—When the

feet are being brought up to the body in the third position, as in plain swimming, the arms are to be carried from the body outward, with the hands edgeways to cut the water, until both arms are in a line across, and at right angles to the body, as the kick is being delivered, the arms, with the palms of the hands, offering a resisting surface like the blade of an oar, should be brought down with a swooping movement to the side of the body.

A STILL FASTER METHOD, and one generally adopted at swimming matches, is accomplished by lifting the arms when parallel with the body out of the water, and carrying them beyond the head; hands and arms are then dipped into the water, and by a strong powerful stroke brought to the side of the body, describing, when doing so, a half circle with each hand. A half circle is also described with each hand in the air, from the time they are lifted, until they are again laid into the water. *(See Plate V.)*

THE FASTEST METHOD OF SWIMMING ON THE BACK, though more difficult to master, is done with both hands under water, in the following manner:—

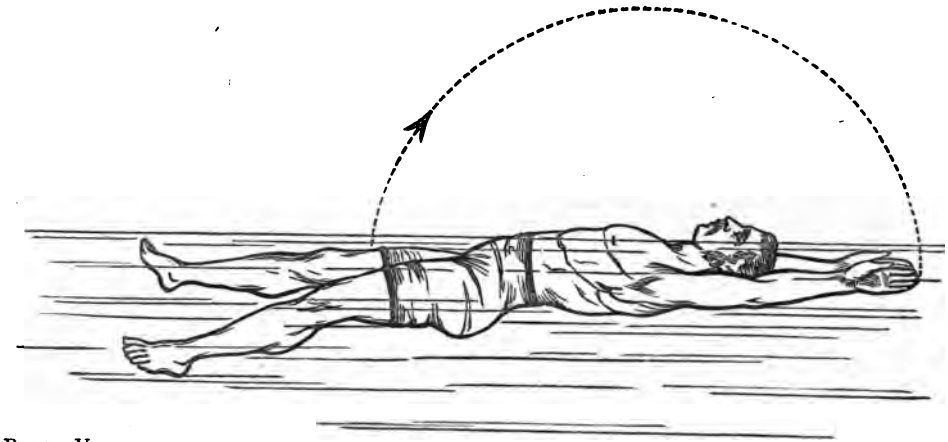

PLATE V.

Start the movement with both hands at the side. Bring them up along the body, palms facing to the bottom of the water, sink the elbows, that the hands may be kept at the same level until they have come up to and directly above both shoulders. This is the first position with the arms.

Immediately the hands have reached the shoulders, turn the palms upward, and stretch the hands as far in advance of the head as they can reach. This is the second position.

Now, turn the palms of the hands outward, forming a propelling power, and with a strong circular movement, bring them to the position from whence they started, parallel to the body. This completes the third position.

Now, work with arms and legs together, as follows:—

While the hands are performing the first part of the movement, the legs should be drawn up and a sharp kick delivered.

As the second motion of arms is being gone through, the legs should be again drawn up, and—when the hands are moving to the third position,

the legs should be kicked wide apart and brought suddenly and vigorously together.

It will thus be seen, that at every complete stroke with the arms, the swimmer has the advantage of two distinct and well-delivered kicks.

This mode of propulsion on the back is by far the fastest of any, it is also the most graceful, owing to the length of the reach with both hands, and as hands and arms are all the time under water, all splashing or disturbance on the surface is obviated.

As showing the speed which may be attained by swimming on the back, it may be mentioned that Mr. Marquis Bibbero, who is acknowledged to be the most graceful swimmer on the back, accomplished in a London Bath, a few years ago, the feat of swimming one mile on his back in thirty-nine and a half minutes. To go this distance he required to traverse 105½ lengths of the pond. Of course he had the advantage of the push-off at each end, at which he is extremely clever, still the feat shows to what perfection this branch of the art may be brought.

FLOATING.

Floating, as understood in connection with swimming, is the art of knowing how to balance the body in the water, that it may support itself on the surface, without any apparent effort of either arms or legs.

Many a life has been lost by drowning through ignorance of this important branch of natation. When through cramp, fatigue, or any other cause, the limbs have been deprived of their wonted power or vigour, it is invaluable, as the swimmer can then turn on his back, and rest or wait till help arrives.

A knowledge of floating is of great service as being the principal means of enjoying a rest during the course of a long swim; while as enhancing the enjoyment of a bathe, for a swimmer to lie on the sea with his face to the sky, floating the one moment on the crest of a wave, and the next being

carried between the clear rollers, swaying with the movements of the ocean, is little short of ecstacy. To some people, especially those inclined to corpulency, and to females, it is as natural and easy as to others it is apparently difficult, yet, to float, especially in salt water, is possible with every one.

The chief consideration necessary on the part of the pupil is confidence.

Let him lay himself on his back in the water, having first taken a long breath, lean the head well back, for, if the head be not far enough back, the chin and mouth will be under the surface of the water, while the top part of the face will be clear. This order of things must be reversed; the forehead must be immersed, and the chin, mouth, and nostrils be elevated, so that inspiration and expiration may not be interrupted. *(Reference to the water-line in Plates VI. and VII. will fully explain this.)*

The arms should reach in a straight line beyond the head, the part between elbows and shoulders pressing against both sides of the face, the backs of the hands lying on, or above the surface of the water. *(See Plate VI.)*

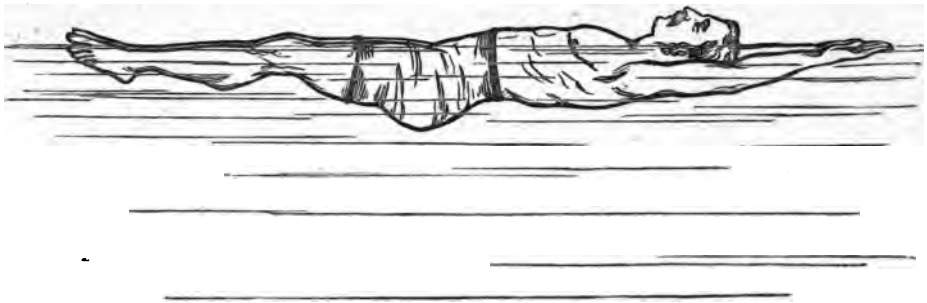

PLATE VI.

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This position of hands and arms balances the body, by throwing extra weight on the upper parts, and counterbalances the weight of the legs, which are the heaviest parts, owing to their density, and distance from the centre of gravity.

The legs should be stretched well out, either together or apart, the back slightly hollowed and the chest fully expanded, as of course the larger the quantity of air in the lungs the greater will be the buoyancy, or floating power.

This position in floating, with the legs together, looks very neat when performed in clear calm water.

TO MOVE THROUGH THE WATER FEET FIRST, with the body in the position as described, is a beautiful and graceful performance and is done by using the hands like a screw propeller, turning them by working the wrist with a sculling movement. During the first attempts the feet or head may sink, but after some trials and by perseverance a good floater will do it very well.

TO FLOAT WITH ARMS AND LEGS BENT. The hands should be placed flat under the head, the elbows kept wide apart, the hands and forearms

placed in a line across, the knees bent and kept apart from each other, the feet drawn up toward the body, and the heels nearly touching. *(See Plate VII.)*

TO LIE IN THE FORM OF ST. ANDREW'S CROSS. Stretch legs and arms out wide apart, keeping the limbs rigid and head back.

If the legs are kept together and the arms stretched out in a line across the shoulders the letter T is formed.

A number of curious and interesting movements may be executed in floating, amongst others, that of catching with the right hand, the great toe of the left foot, and *vice versa.*

This is done by putting the arm across the back under the body, bending the knee, and turning the foot in the direction of the opposite hand, catching the great toe with forefinger and thumb, and lying perfectly still.

After some little practice the pupil will be enabled to do this with both hands and feet at the same time. Of course it will be understood that to do it well, it is necessary to inflate the chest to the greatest extent, by leaning the shoulders well back.

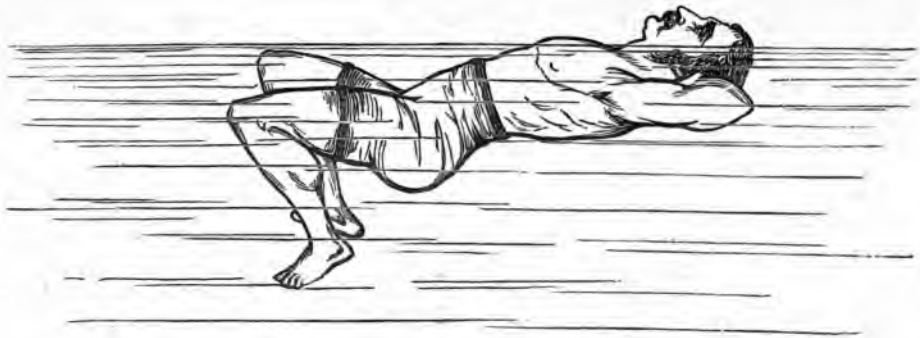

PLATE VII.

The practised floater can introduce many neat, graceful, and statuesque positions while lying on the surface of the water, and while doing so he will be demonstrating how easy it is to float the body under almost any circumstances.

Ladies as a rule excel in this branch of swimming. We have had many lady pupils who, when floating on the surface of the water, could lie in almost any position in which the body might be placed.

SCULLING ON THE BACK.

This important method of propelling the body by means of the hands, without using the legs, and when lying on the back, is easily learnt, and once acquired will be found to be of great utility.

TO MOVE HEAD FIRST. The position of body and legs is the same as in plain floating, the hands and arms being kept along the side of the body.

Work the hands like a screw, the wrist being kept quite loose, the fingers pointing obliquely to the surface of the water, and the palms facing in the direction of the feet. The elbows should be very slightly bent, so that the hands, when turning to perform the screw-like movement, may be also pushed in the direction of the feet. One can attain a good speed when the movement is well done. The hands must not disturb the surface of the water.

This may be varied by lifting each foot out of the

PLATE VIII.

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water alternately, and striking hard so as to raise a spray. This is called the "steamer," but is of no practical use whatever.

TO MOVE FEET FIRST. Bend the elbows and pass the hands along the body. When they have got to their full extent along the side, turn the palms and fingers outward, again bend the elbows and pull the hands outward in the direction of the head. This is the propelling part of the stroke. If the feet incline to sink press the hands slightly downward. *(See Plate VIII.)*

TREADING.

To "tread," or sustain one's self in an upright position in the water without any help from the hands, is very easy, and will be found to be of great service in cases of accidental immersion.

Instances have come under the writer's notice of people who could not swim being thrown suddenly into water beyond their depth, and by treading, keeping their head above water until the arrival of help.

Let the feet sink, and commence by kicking downward in the same manner as when climbing a ladder—that is, with each foot alternately—the soles of the feet being the resisting surface.

Treading may also be performed by using legs and feet in the same manner as in ordinary or breast swimming; the kick being, of course, directed downward.

The hands or arms may be kept either above or

under the surface. In order that the swimmer may partake of refreshment without leaving the water or hanging on by a boat, it is best he should practise with arms out of the water. When prizes are offered for competition in treading, the swimmer who shows the greatest part of the body above the surface is adjudged the winner.

Non-swimmers must keep hands and arms under the surface. In cases of ice accidents, treading will be found to be the only safe means of sustaining the body in such a position that the head may be above water.

AN EASY WAY OF RESTING WHEN FATIGUED.

Lie still in the floating position—head as usual laid well back; work with the feet alternately as follows: let each knee move like an oscillating pivot; lift the one foot gently until it is quite close to the surface of the water; then by a slight movement of the ankle-joint turn the foot until toes and instep are in a line with the front of the leg; let the sole press the water downward, bending the knee when doing so. Repeat with the other foot. *(See Plate IX.)*

These movements to be performed slowly, and for appearance sake, as gracefully as possible, and keep the hands clasped in front of the chest, as in plate.

By this means one may lie for almost any length of time on the surface and not feel in the least tired.

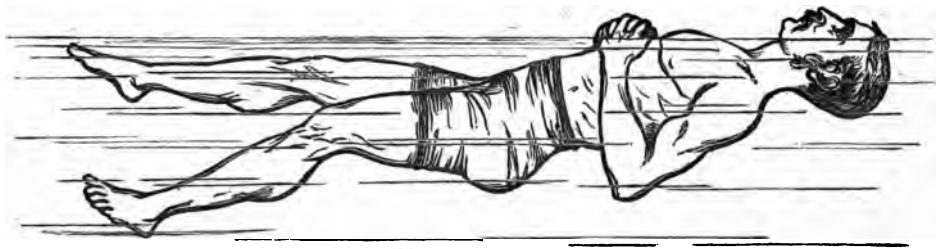

PLATE IX.

TO UNDRESS ON THE SURFACE OF THE WATER.

Lie still, as when resting, by beating the water with each foot alternately.

Commence to undress by taking off the left boot or shoe — using the right hand to loosen the laces or buttons — beating the water with the right foot and sculling with the left hand. When the fastenings are loosened, use both hands in pulling off the shoe or boot—keeping the lungs well inflated when doing so. To take off the other repeat with the opposite set of limbs. When the boots and socks or stockings have been removed, unbutton the coat and vest and take them off in the ordinary way at the back, the feet beating the water the while.

The most difficult part of the operation is in divesting one's self of trousers. This is, however, comparatively easy, if one is careful enough

not to gather them into a bundle when turning off at the heels. Of course they have to be removed from one leg at a time. If the left leg is taken first, use the right hand to push and pull the trouser down, beating the water with the right foot and left hand. Repeat *vice versa.* To remove the shirt, beat the water with both feet alternately; begin by loosening the wristbands, then neckband or collar; gather the garment in front up to the neck or breast, and by a quick and sure movement lift the whole over the head, pulling the hands and arms out of the garment, which by this time is at one's back.

The whole suit has thus been removed, and if the operation is well done the head need not be under water at all.

To take off the clothes in the water in the manner described is worth practising, as no one knows how soon he may have occasion to prove its utility.

DIVING.

"Wedges of gold, great anchors, heaps of pearls,
Inestimable stones, unvalued jewels,
All scattered in the bottom of the sea."—*Shakespeare.*

The utility of diving as a means of saving life, recovering lost property, and wresting from the deep such articles of commerce and value as pearls, coral, and sponges, prove it to be a worthy adjunct to swimming, and of great service in itself.

Man, however, is not naturally adapted for continuing under water without artificial appliances for any lengthened period, as his lungs are not capable of containing more air than will keep him alive for longer than a very few minutes.

The most noted divers are the South Sea Islanders, who descend in search of coral; the Ceylonese, who fish for the pearl-oyster; and the natives on the shores of the Grecian Archipelago, who are the most expert at cutting the sponge from

its native bed. Some of these people—who may be said to pass all their time on the waters—with all their experience, seldom remain under water longer than a minute and a half, and according to the most reliable authorities never exceed two minutes. The descent is aided by their carrying a stone or weight, thus obviating the necessity of working their way downward. A line is also fastened round the waist, and on feeling exhausted at a given signal the diver is drawn to the surface at once. Not unfrequently, on emerging from the water, blood issues from mouth, nose, and ears.

Some of our own swimmers, who practise diving merely as an accomplishment or pastime, have on many occasions proved themselves superior to these born experts, as the following will show. Several writers have questioned the possibility of a natural diver reaching a depth of sixty feet. The present writer took part in a diving match on the Frith of Clyde, off Greenock, when one of the competitors —Mr. James Milne of Edinburgh—brought an object from the bottom at a depth of seventy-two feet. While at a distance diving match—that is, where the competitor traversing the greatest dis-

tance under water in a straight line is declared the winner—which took place at Edinburgh, the victorious competitor—Mr. Baillie—swam two hundred and forty feet before coming to the surface. This has since been eclipsed by Mr. Peter Johnson of Manchester, who swam over three hundred feet in one dive. We have taken time for this famous diver when he was under water for three minutes fifty-seven seconds. He has even excelled this feat; having on one occasion, at a public performance, been under for four minutes seven seconds!—certainly one of the greatest feats in diving of which we have any authentic record.

The exploits of Nicolo Pesce, the Sicilian "Fish," as related by Father Athanasius Kercher—who says in his description of this so-called amphibious man, that he could stay under water for a day at a time—must be dismissed with other like stories to the land of fable, the exploits with which they are credited being quite beyond the powers of human endurance. The wonder is that such tales should have been at any time credited, even by those who knew little of either swimming or diving.

Diving is to a great extent a natural accomplish-

ment, and the length of the stay under water depends almost altogether on the conformation and capacity of the lungs; yet although every one who can swim may not excel at diving, they should be enabled to descend and move under water to some extent at least.

Any one of ordinary capacity of lung can hold his breath for say thirty seconds; in this time he can go to a depth of twenty or thirty feet, and in ordinary circumstances have time to recover a body or an object and return to the surface without much exertion.

If a swimmer can accomplish this, he may go to help a drowning person, and care not whether he be struggling on the surface or lying on the bottom. Many a life has been lost by swimmers being unable to go under the surface and catch the drowning person. We would therefore impress upon all who can swim the importance of practising diving, as well as moving along the surface of the water.

With a knowledge of how to empty the lungs of the impure and fill them with fresh air, one can stay down forty, fifty, or sixty seconds, without great

inconvenience, and the time may be still further extended by careful attention to one's own powers of endurance. The practice is very interesting, and the clever diver is fond of working downward and cleaving through a great body of water. It is a fine sight to watch the different effects of light and shadow on the rocks and gravel at the bottom of clear water. The diver can also make interesting experiments at different depths as to pressure of water, buoyancy with different inflations, &c.

The following instructions will prove of advantage in this branch of the art:—

TO DIVE FROM THE SURFACE WHEN SWIMMING. Droop the head, at the same time performing the positive part of the arm stroke vigorously, turning the palms of the hands to the surface of the water. Immediately the body is in position for sinking bring the legs sharply together in the air, and renew the kick as soon as the legs and feet are under water.

Work downward by bringing the arms round, and work the legs as in ordinary swimming. Of course the movements are made upward, with the palms of the hands and soles of the feet directed to the surface.

TO INFLATE FOR A LONG STAY UNDER WATER. Before inflating, the lungs must be completely emptied of all impure air. This is done by exhaling with mouth open, and the process is further helped by contracting the chest and stooping forward. Inflating with pure air should be commenced by taking short inspirations—each inhalation being longer than the one immediately preceding.

As the chest expands lean the head and shoulders back; this renders the lungs capable of holding a larger supply of air.

After eight or ten good breaths the diver should be ready for the plunge into the water, which should be done without any jerk.

If on getting under the surface a feeling of oppression is experienced, allow a very small quantity of air to escape through the nostrils. The feeling of oppression is further eased by gulping with the mouth and throat, as if swallowing air. Some divers take a little water into the mouth occasionally. We would not recommend this, especially in deep diving in the sea, or in a salt water bath.

It is well that one, when improving either in time or distance, should do so very gradually.

There is a delusive feeling of ease which sometimes takes place, as if one could stay down for almost any length of time. Immediately this is felt the diver should come to the surface without loss of time, as it very often precedes fainting or dissolution. We have been present at several diving matches when some of the competitors had to be rescued, and were brought up senseless—the whole surface of their bodies being of a deadly pallor, and the eyes sunken. In nearly every instance, however, a very few minutes in the air restored consciousness, and in half-an-hour they were quite well.

When preparing for a long dive all excitement should be avoided, as it accelerates the heart's action, when the air will be sooner used up in supplying the blood with the necessary quantity of oxygen.

TO SEARCH FOR AN OBJECT UNDER WATER. Having got down to the bottom, kick the legs alternately upward with the soles of the feet to the surface, keeping hands and face close to the ground and the eyes open.

The hands are used to direct the course when

looking for the object, and to pick it up and carry it when discovered.

TO COME TO THE SURFACE. Turn the face upward, get both feet to the ground, bend the knees and push upward with a good spring from the bottom, swimming with the usual stroke. The movements in this instance being directed downward.

Be careful not to open the mouth before coming to the surface. The light is sometimes deceptive, and so keen is the amateur to recover his breathing that the inclination is to open the mouth before the surface has actually been reached.

TO SWIM A DISTANCE UNDER WATER AT THE SAME DEPTH is accomplished by keeping the hands at an angle partly in the direction of the feet and partly to the surface of the water. The hands act as the rudder to keep the swimmer deep or shallow, and from going in the direction of right or left.

Some divers judge the distance under water by the light and use the hands accordingly. The leg stroke is always the same.

TO DIVE FROM DIFFERENT HEIGHTS INTO SHALLOW OR DEEP WATER is merely a matter

of inclining the body at different angles more or less acute when springing off.

When into shallow water be careful not to describe too sharp an angle, else the consequence may be a severe knock at the bottom.

A plunge from a height of say from four to eight feet above the surface into water about five feet deep may be done with the body at about an angle of forty-five degrees.

THE HEADER from almost any height into deep water will be accomplished with fine effect at an angle of ninety degrees. This, when well done, is a beautiful feat. The body should glide into and through the water without a splash, the toes being the last point seen. The body should be kept perfectly rigid after the spring off, but as soon as it has entered the water, the back should be curved, face turned upward, and the hands put together in front of the head, then by a strong stroke or two work upward. The points of the fingers should emerge first above the surface.

On coming to the surface after a dive avoid quick strokes or splashing. To give effect to the

dive the stroke should be renewed gracefully and with apparent ease. Neither should there be any noise made with the lips as if one was about to burst the mouth open.

Practice and experience will, however, do more in teaching one to dive than volumes of printed instructions.

CRAMP.

The muscular contraction popularly known as cramp is the dread of nearly every swimmer. Nor is this to be wondered at, as so many fatal accidents are attributed to its influence, it is very painful in itself and, when it gets hold on any part of the body, renders the affected limb for the time being powerless.

The attack is generally in one of the legs or arms, and the swimmer may sink if it is very severe and the proper means of getting rid of it are not at once adopted. Very often it is brought on by the bather having gone into cold water after violent exercise, the muscles not having been properly relaxed after a severe or undue strain has been put upon them. It will also attack the bather whose body has been too cold on entering the water, or has given off much caloric in con-

sequence of having been too long immersed in water. It will often come on should one when cold indulge in motionless floating for any length of time.

One of the most effectual means of getting rid of cramp is to turn on the back, and by a sudden effort to jerk the affected limb suddenly upward in the air and out from the body, pulling it as suddenly back again, and repeating until the pain has gone. If the contraction is in the calf of the leg—the part most generally affected when swimming—turn the toes upward toward the body, hold them so for some seconds, then pull up the leg and kick suddenly out again. This is a painful but very often a successful remedy.

Should these attempts to shake off cramp be unsuccessful the attack must be severe, in which case the swimmer will need all his presence of mind. If a great distance from the shore, let him keep his thoughts collected; avoid all splashing or violent movements; turn on the back and lie perfectly still. If the pain is felt in either of the legs he may scull with the hands; if in the arm, he should kick with both legs, and

proceed in the direction of the nearest boat or landing point.

Should the cramp seize both legs, the bather must bring the feet close up to the body in a crouching posture, letting the knees come well up over the body, and scull with both hands.

A friend of the writer's, during the course of a long distance swimming match, swam for the last two hundred yards with both legs severely cramped; while the writer himself has often felt it, especially when floating for a long time, and has succeeded by sudden jerking in sending it off.

The worst form of cramp is that which is felt in the upper body and abdomen. It is very severe and sudden in its action, and good swimmers have been known to sink almost without an effort under its painful and powerful influence. This species of attack seizes the upper part of the body—contracts the chest—which expels the air from the lungs; and the body, thus deprived of its floatative or sustaining power, sinks like a weight. Bad as is this kind of attack, there is hope when the swimmer keeps calm and retains his senses. The mode of procedure is to keep on the back, endure the pain with as much

fortitude as one can command, and use every effort to keep the lungs inflated by taking as long inhalations as possible. Kick steadily and vigorously, using hands and arms to increase the speed as well as to keep the muscles of chest and shoulders in exercise.

The last mentioned kind of cramp is caused by the arms and upper parts of the body having been kept too stiff and rigid for a great length of time, the muscles of arms and shoulders not having been sufficiently relaxed during part of each stroke.

In every case, when the swimmer has been got safely out of the water, that part of the body which has been affected should be rubbed briskly, and strong spirits applied to it as an embrocation. The rubbing should be kept up till the knotty lumps which are caused by the contraction of the muscles have disappeared, and those muscles have resumed their former elasticity.

Should the patient feel inclined to sleep he should be wrapped well up in hot flannels or blankets, as a means of warding off the attack, which might return again in case of chill while sleeping. After a

severe attack the limb or part of the body which has been affected will feel pained and stiff for some days; in which case embrocations such as camphorated oil or ammonia and hot fomentations may be used with advantage.

WEEDS.

Next to cramp, the dread of the swimmer is to find himself among sea-weeds or stringers. These generally grow to a height of from six to fifteen and twenty feet, so that it is no uncommon occurrence for the swimmer, when moving along in comparatively deep water, to find himself caught in a clump of the disagreeable stringers, and if not careful, he may soon make the startling discovery that his legs or arms are held fast by the slimy thong-like blades.

Immediately he feels himself passing over these weeds, the swimmer should at once cease making any motion with his legs, and by long steady arm-strokes pull the body along the surface of the water, using, it is needless to say, every precaution to keep the limbs clear of the enemy. As soon as the legs are clear, turn on the back, float them to the surface, and scull out to deep water.

Should the legs be caught, one must while lying on the back beat *very slowly* with the feet, and with the hand opposite to the bound limb cautiously insert his fingers between the stringers and the leg, and slip the hand along the leg, round the heel, and off by the toes, in somewhat the same manner as when putting off a stocking. Of course it will be plain that if the other leg is bound the opposite arm must be used. It is folly to use both hands at the same time in an endeavour to loosen the weeds from any part of the body. While the one hand is working the other must be performing the sculling movement.

The above directions, slowly and surely performed, are the safe methods of extricating one's self from weeds.

Swimmers must be careful at all times not to dive in the neighbourhood of a weedy bottom.

THE STING OF THE JELLY FISH.

Another of the sources of annoyance to which swimmers are subject is the sting of a variety of the *Acalephæ* called *Medusa*, and popularly known as "Sea-bladder," "Sea-blubber," "Starcher," and "Jelly Fish."

This interesting specimen of marine animal life is to be seen in great numbers at our coasts in the summer time, between the months of July and September. In form they are convex, and when moving along in the water resemble at first sight the top part of a ball or floating mushroom, and seem like a piece of partially melted snow floating on the surface of the water. In its progress through the water the dome-shaped part is kept in advance, and the forward motion is attained by movements of contraction and delatation of the disc. If any portion of the creature is touched, the body is immediately contracted and the fish sinks out of sight.

THE JELLY FISH.

Its diaphanous tissue, often decked in the purest tints, is so fragile that when abandoned on the beach it melts and disappears.

De Blainville says—"These creatures, which are so soft that they probably could not repose on solid ground, require to agitate constantly in order to sustain themselves in the fluid which they inhabit."

These movements got for them from the ancients the name of *sea lungs*, the motions resembling the action of respiration in the human chest. Fragile and weak as they look, they have a voracious appetite, and feed on young shellfish, molluscs, and worms, swallowing their prey at one mouthful without taking time to divide or masticate it. Should the victim resist, Mr. or Mrs. Medusa holds fast without making the slightest motion until the captive has grown tired with its efforts, when it is swallowed with as little show of ill-feeling as if it had all along been perfectly passive.

"Jelly Fish" vary in size from a few inches to three feet in diameter. In some instances they throw out a phosphorescent light after dark. Most of the species produce an acute pain where they

touch any part of the human body. The feeling is similar to that experienced on coming in contact with the leaf of the nettle, hence they are named Acalephæ, from the Greek word signifying nettle. Father Feuillèe says of it, "The sea bladder occasions me on touching it a sudden and severe pain accompanied with convulsions."

The liquid which fills part of the body is of such an acrid nature, as to irritate and blister the skin, even after it has been dried.

Fredol mentions the case of a young seaman, one of the crew of the *Princess Louise,* who jumped naked into the sea to seize a magnificent specimen of physcalia. The creature surrounded his person, and the man overcome with a feeling of burning pain cried out for assistance, and on being taken on board, the pain and inflammation became so violent that brain fever set in, and fears were entertained for his life.

Fishermen in different parts of our coast very often, when taking in their nets, have their hands much pained, and blistered, by coming in contact with particles of the *jelly fish* which had adhered to the cording, even after they had been broken

up and apparently destroyed, by the handling of of the nets and the disturbance of the water.

We have seen the whole surface of bathers' bodies affected in the same way on bathing in the sea during or after a storm, when parts of the fish almost infinitesimal in size were floating about, after being broken up by the violence of the weather.

When the *Medusa* comes in contact with the swimmer's neck, chest, or shoulders, the sharp burning pain is invariably followed by retching, vomiting, and nausea, sometimes very severe. The part affected becomes red, sometimes swollen, and has the appearance as if a mustard poultice had been applied for some time; small postules with white points are also to be seen.

We know of one case in which a bather had been so severely stung that he was prevented from taking any exercise for some months, so keen was the attack, and so great the shock to the system. In this case the burning pain was very severe, great sickness and vomiting ensued, and the patient continued in a low state for several days.

On feeling that he has been stung, the bather

should leave the water at once, and as quickly as possible swallow some brandy, undiluted brandy or spirits should also be applied to the affected part.

Another remedy is to take a small dose of ammonia slightly diluted with water, repeating every hour until the sickness has gone.

Fishermen on the west coast of Scotland apply a mixture of brandy, or whisky and tobacco or snuff to the part. This mixture deadens the pain and to some extent prevents the after consequences of sickness.

It has been found that almost any of the alkalies has the properties of counteracting to a great extent the evil effects of the poison. Therefore potass, soda, or ammonia applied to the part, or taken inwardly will afford relief.

On getting better, a gentle laxative will be found to be of great advantage.

POPULAR ERRORS.

"Error of opinion may be tolerated, where reason is left free to combat it."—*Jefferson.*

There are many popular errors in connection with swimming which have become so common that their mention seems almost like household words, and on many occasions the teacher has the greatest difficulty in dispelling these ideas.

Some teachers and writers on swimming will insist on continuing the delusion, that to attain perfection in the art, nothing can be better than to watch and imitate the movements of the frog. This is a great mistake, as the frog kicks his hind legs straight back, opening the toes so as to spread the web connecting them, that the soles of his feet may be the resisting surface with which he pushes the body forward. This part of the kick having been delivered, his feet are pulled up to the body in a straight line, and so on, recovering and kicking always in straight lines.

It must therefore be plain that man, not being web-footed, and the soles of his feet being so small in proportion to the size of his body compared with the frog, that he must act on quite a different principle. It will be seen, in referring to the instructions on plain swimming, that with man the soles of the feet are not the resisting surface, and are never therefore—unless when mechanical means such as foot-plates, or *flippers* are employed—used as a propelling power.

Another error, often repeated, is that while diving if one goes under with his eyes open, the pressure of water between the eyelids prevents them being closed, and also, that they cannot be opened if closed before going under the surface, as the weight of water on the lids prevents that being done.

Dr. Franklin, in his essay on swimming, was the first to make this mistake, and other writers have gone on propagating the false and absurd theory.

The fact is, that both eyes and mouth can be opened and closed at will under, as well as above, the surface of the water, and that without the slightest inconvenience.

Dr. Franklin's essay on swimming, which was not written spontaneously by that great man, but at the request of a friend, was one large error, and is full of mistaken ideas.

A popular idea prevails that no one should bathe in the open air when it is raining, as then the water is cold. Now, the reverse is the case. If the swimmer has a comfortable place to undress and dress in, he will find the water warmer during a shower of rain, no matter how heavy, than at any other time, and altogether the sensation of swimming in the water, and having a shower at the same time on the head and face is very pleasant.

It is an error, when caught in weeds, to dive in the attempt to pull the plant out by the roots from the bottom of the water. We have lately seen this method advocated as a means of extricating one's self from weeds, and a more mischievous piece of instruction could not be given, or one more likely to lead to fatal results. The long grass is so slimy and slippery, that to catch hold of it when in the water is next to impossible. The unfortunate one who attempted to rid himself of weeds

in this manner would become more entangled, and in all probability never live to tell anyone else of the error.

It is an idea with a great many people that self-taught swimmers are the best. It does occur that some who have learned to swim without a teacher become good swimmers, but as a rule it will be found they do not excel. Nearly all the best exponents of the art of the present day have been brought up under the careful eyes of old and experienced professors.

The pupil who is fortunate enough to have a good teacher will, if possessed of an average amount of intelligence, attain to an excellence far in advance of one who works away by himself, in less than half the time, and with much less practice.

We have times without number had swimmers under our care, of twenty or more years' practice, who have made greater progress in ten or twelve lessons, than they had done with hints from friends, and with observation, since they at first were enabled to sustain the body in the water.

TO SAVE LIFE FROM DROWNING.

"The conquering hero less demands our praise,
Who boasts of victory with ten thousand slain,
Than he who from untimely death doth raise
One victim to his weeping friends again.
In acts like these ye gen'rous few proceed,
Ye noble patrons of the human race,
High Heaven approves the all benefic deed,
And in its records grants your names a place."

In the 1st volume of the "Transactions of the Royal Humane Society, from 1774 to 1794," we find a theory of some value propounded as follows: "Dr. Adam Smith in his approved Treatise on the Wealth of Nations, says—'In commercial concerns, every capital multiplies or produces a number of new ones, insomuch that the loss or accession of the capital to the general stock, is to be considered as the loss or accession of the means of procreating new capitals.'

"This proposition is equally applicable to population as to commerce, so that we may establish it as a fair and incontrovertible position, that the subduction or addition of a single life, not past the period of propagation, from or to the general mass of the population of a country, is to be considered as the subduction or addition of a number of lives, increasing in an ascending series."

Population, it has been conceded by nearly all writers, constitutes the riches of a country, whatever then tends to preserve it must be of infinite value. The ancient Romans looked at the question in this light, and bestowed the highest honours on him who saved the life of a citizen. For, reasoned they, he has not only saved this one, but has perhaps given us many.

Considering this argument as sound, how much praise is due to the National Lifeboat Institution and the Humane Societies of our country. Nor can we afford to pass over the individual efforts of the humane and noble-hearted swimmer, who, seeing a fellow-creature in danger, and knowing his duty, fears not, even at the risk of his own life, to perform it.

We have had the honour and pleasure of numbering among our friends, four heroes, who have been the means in the hands of Providence of saving no less than two hundred and thirty persons from almost certain death by drowning.

Surely these men may be looked upon as benefactors to their country. There are others who have been the means of saving one, two, three, or more lives from a watery grave, and in each case risked their own life in the noble endeavour.

In the words of the respected gentleman to whom this work has been dedicated, "All honour to them! God bless them! They will sleep the sounder with the recollections of their daring deeds, known perhaps only to a few." We cannot refrain giving another expression of this philanthropic citizen, who, when speaking on the subject said, "May I be allowed to say in all reverence that he who saves a body is held second only in honour to him who saves a soul."

Especially applicable are these words to the case of the rescue of the unfortunate ones

> "Weary of life, glad to be hurled
> Anywhere, anywhere, out of the world"

whose sins, sorrows, and trials have led them to think there was some truth in the words,

"Out of the world out of sorrow."

One who took an active part in the rescue of a would-be suicide says,—the memory of it will never be effaced from my memory, so great was the joy of the preserved, the victim of an hour, that on being restored to consciousness he clasped his arms round the knees of his preserver and showered kisses and tears upon his feet. His grown-up family were not much less profuse in their expression of thanks, and repeatedly affirmed that if only they had it in their power their preserver should never want, and we trust in all humility that he never shall.

There are many swimmers, however, who in justice to themselves, would have to think twice before trusting themselves to carry an insensible person when in the water, not to speak of one in the struggles of death, to a place of safety.

The following lessons we hope may prove of real service, as showing the approved methods of ue. We have taught them in classes with every

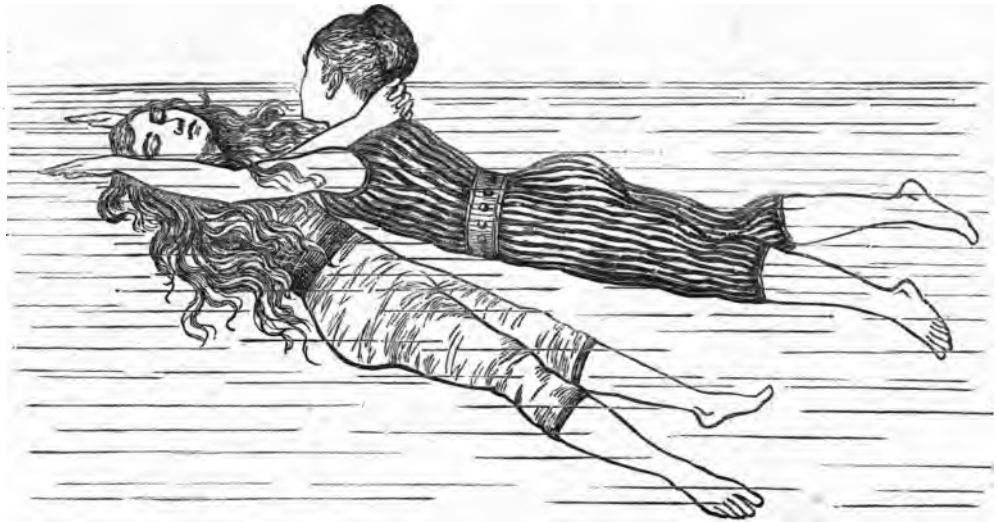

PLATE XI.

mark of success, several members of these classes having, since receiving the instructions, been successful in saving life, and have thus practically proved the utility of their lessons.

Should the drowning person be a distance of some hundreds of yards from the shore, the rescuer had better take time to divest himself of his shoes, jacket, and vest. These being the heaviest portions of attire, the few moments occupied in taking them off will soon be made up in the speed with which he can swim when relieved of these parts of his clothing. He will also have the use of his limbs to a much greater extent than when dressed; besides, there is less probability of his being caught in the grasp of the struggling person.

It makes the greatest possible difference if the rescuer is naked and the drowning person clothed, than if the case were reversed.

The rescuer must be careful not to swim so fast as to put himself out of breath; he must reach the spot comparatively fresh, and as little excited as possible.

TO HELP OR CARRY A TIRED SWIMMER. This will also apply to the rescue of one who cannot swim, but who may have been accidentally thrown

into the water, if he is obedient and passive, as such an one may occasionally be found even under such circumstances. When the rescuer has swam to the person requiring help, let him put the tired one's hands round his preserver's neck, and both are face to face, the rescuer will now swim with his ordinary breast stroke. Plate XI. will fully explain the position.

This is an easy way of assisting one in the water, and by its means a boy or girl will be enabled to carry a very strong or heavy person.

ANOTHER METHOD OF RESCUE. When nearing a drowning person, the rescuer must try to get to his back, not, however, putting off too much time in trying this, then by diving under him, use both hands to throw water on his face and eyes, this will have the effect of blinding, or to some extent stupifying him, when he may be caught at once. The rescuer must now catch him between elbow and shoulders, with both hands, keeping the palms of his own hands facing inward, that is with fingers over the front and thumbs round the back part of the drowning person's arms. Let him now turn on his back, and with the rescued one above

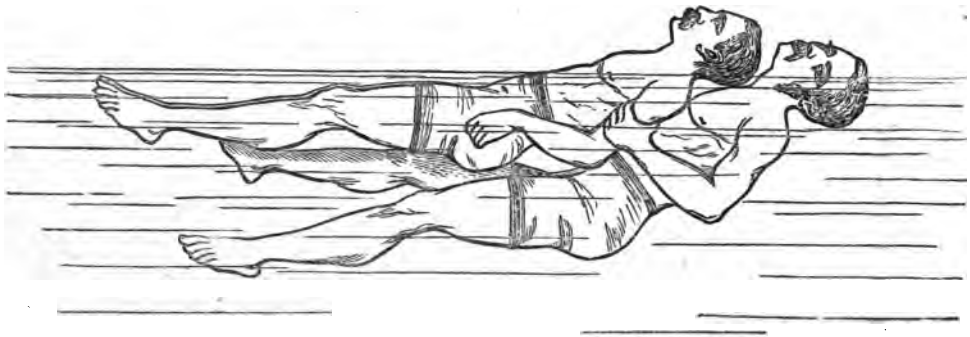

PLATE XII.

UNIWOM

him, with his face upward, swim with the legs performing the plain movements. *(See Plate XII.)*

The recommendations of this method are, that the speed when carrying a person when swimming on the back is greater than when on the chest or side, and using one hand to support the weight. The rescuer's position gives him full control over all the movements of the person who is being supported, while the rescued one is inspired with confidence, as his mouth, and, in fact, the whole of his face and head, is kept clear of the water; the strong grip with which he is held also adds to this feeling of security. No matter how powerful the struggling person may be, he will find it a hard task indeed to turn round on his rescuer once he is master of this method.

Should the drowning person have his clothes on, the rescuer will find the work of obtaining a catch and keeping it one of comparatively greater ease. Let him catch the collar of coat or vest or the neckband of shirt with the one hand, at the same instant, catch the arm or sleeve of the coat, turn on the back as before and swim to the landing point.

TO DISENGAGE FROM THE GRASP OF A DROWNING PERSON.

To rescue a suicide is a matter of much greater difficulty than even the death struggles and clutches of a person who may have been thrown into the water by accident. The determined suicide cares not what he may do to the one who attempts to prevent the act of self-destruction. In his efforts to save life it is more than probable that the rescuer will be caught by the drowning suicide, and as such a grip may prove dangerous, it is well that every swimmer should know how to act in such an emergency. It will of course stand to reason, that if one can disengage himself from a would-be suicide's grasp, the same means will enable him to shake himself clear of the clutches of one who has been accidentally immersed, no matter how hard he may struggle.

The methods to be explained have repeatedly

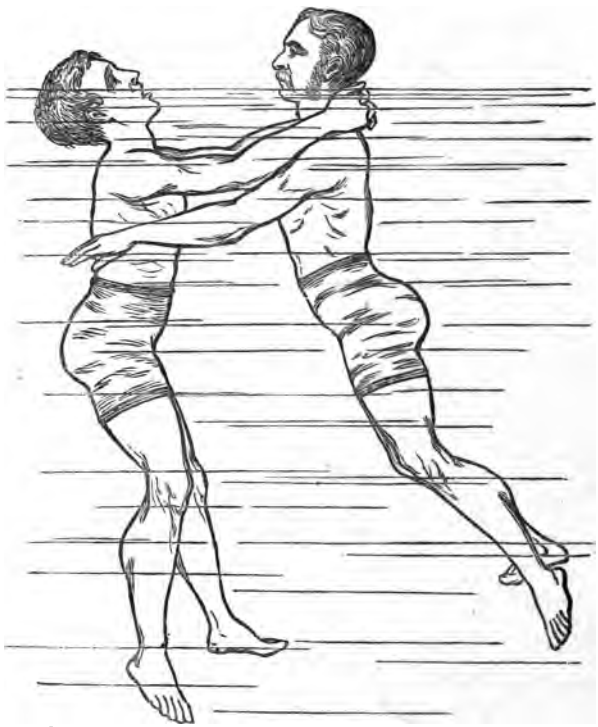

PLATE XIII.

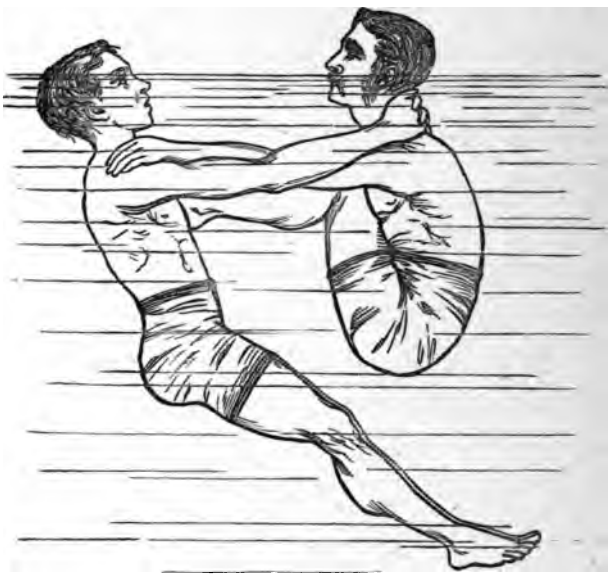

PLATE XIV.

been proved to be certain means of disengaging from the most dangerous clutches.

Should the rescuer be caught by the neck, as shown in Plate XIII., he will at first in a mild way endeavour to pull himself clear; failing in this, let him bring his knees close up to his own body, place the soles of the feet against his opponent's chest, then by a strong and sudden movement stretch the legs out to their full extent, and push the person from him, as shown in Plate XIV. If this is well done the strongest grip will be loosened, and the drowning person will be quite at the will of the rescuer, who will at once seize in the manner before described, and carry him to a place of safety.

The "Hug," as shown in Plate XV., is the worst possible predicament that a swimmer can be in, and thus caught he might in all probability be lost unless he knows the proper method of release. As will be seen, the drowning person has his arms firmly twined round his preserver's waist, both bodies being so close together that there is no room to allow of the feet being drawn up in position for a push off.

To release himself, let the rescuer put his left arm with the hand firmly closed to the small part of the drowning person's back, bring the right hand up to his face, get the thumb and second joint of the forefinger against his nostrils, then by a sudden movement press inward with the left hand, and outward with the right, these movements will bend the drowning person's back, and at the same time push the head under water. *(See Plate XVI.)* Once the drowning person's head is under the surface he will relax his hold at once, and he is then at the will of his preserver.

The movements thus explained in detail may seem somewhat difficult, but in practice they will be found to be comparatively easy. Of course, as before, the person in need of help must be taken hold of at once, and brought to shore, or bank, or boat, as the case may be. We would strongly advise swimmers to practise these methods of saving life. Any number may practise together, each acting the part of rescuer and rescued in turn. After a number of trials they will find themselves prepared for any emergency.

So effective are these means of rescue, that

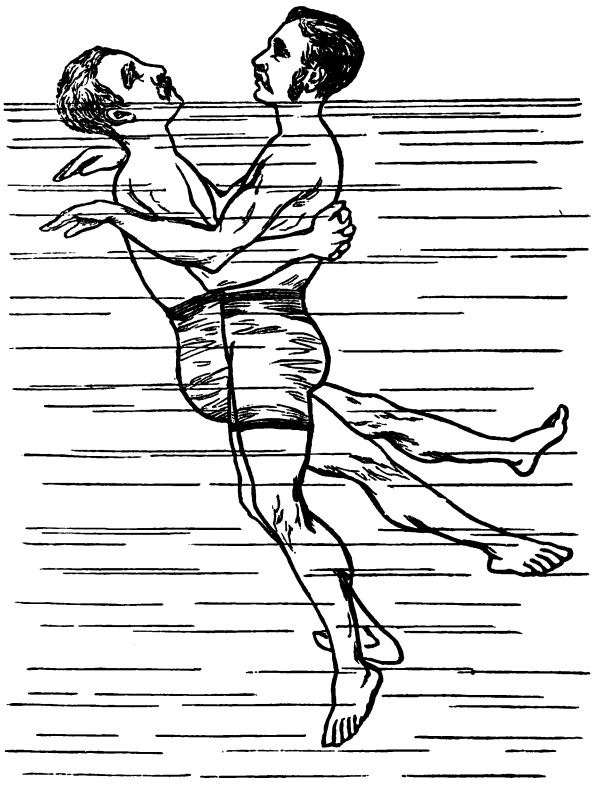

PLATE XV.

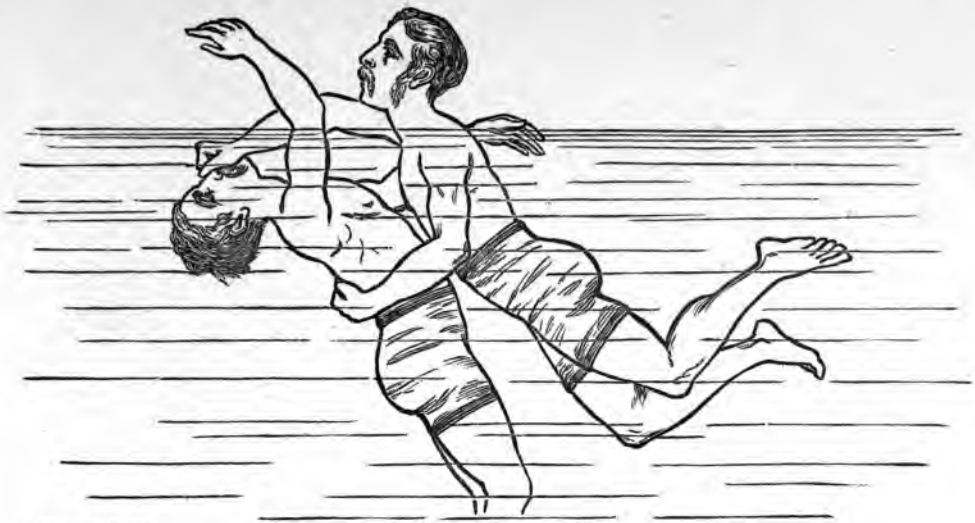

PLATE XVI.

on approaching a struggling person, we would not for one moment hesitate to swim right into their arms rather than wait, or tire one's self in trying to get to their back. Indeed, on one occasion when swimming to the help of a drowning person, who had sank and risen to the surface several times, rather than permit him to go down again and become insensible, and thus require the resuscitation process, we swam right up to him in front, when he was dashing his arms about and clutching at anything. He was got safely out, and in a short time was able to stand up, although it was some time before he recovered from the shock and excitement consequent on his coming into such close quarters with the "king of terrors." If he had been allowed to sink again, the probability is that he would have been more difficult to reach, restoration to consciousness would have occupied some time, and the shock to the system would have been much greater.

RESUSCITATION OF THE APPARENTLY DROWNED.

"By Mercy's tender care alone it came to light,
That Mortals, tho' deprived by water's cold embrace
Of sense and vital powers; though pale and motionless,
Yet still by means applied, to life may be recalled."
Translation from an old Dutch Poem.

"He lives!
And thanks, 'tis all he can, to Heav'n and Mercy gives."
Green.

It has often happened that, but for the presence and action of some one who knew the resuscitative process, fatal results would have followed accidental immersion, even after the person had been brought alive to *terra firma*. And many a valuable life has been lost owing to the proper means of restoration not having been applied in time.

Swimming clubs throughout the country, which have done so much in teaching the art of swimming, and giving prizes for excellence, might also take

up this branch, and instruct their members by drill, or otherwise, in the process of resuscitation.

Within the past hundred years, many methods have been recommended, adopted, and in turn discarded, among others, those of electricity, fumigation, and bleeding. Doctor Coleman of London, so long ago as 1789, recommended the following—"Imitate the natural circulation by inflating the lungs. Electrify the heart and apply friction, these efforts to be continued for four hours if the endeavours are not previously crowned with success."

Previous to 1790 we find tobacco in the enematic form recommended by several eminent London practitioners. But in 1791 Dr. Coleman said of it, "Tobacco in any form is highly pernicious," and further on, "It is more than probable that no one could ever have been recovered where this remedy has been applied."

Among the old methods was Hooker's system of sufflation, and among the more modern ideas is Howard's system of chest and abdominal pressure, so much practised in the United States of America. This is, however, a very harsh method of treatment,

although not as much so as the following:—Dr. Joux, of the third division of the police in Brussels, relates a case which occurred in 1873, where all the remedies of modern science were applied in vain. He then proceeded to use more stringent means, and applied iron plates heated to a white heat to the upper parts of the body, near the vital portions. In a short time faint signs of breathing were observed, and in half-an-hour the drowned man awoke to life. The only inconvenience he afterwards experienced, resulted from the severe cauterization which the skin necessarily underwent. Of course such appliances, even though strongly recommended, are not in ordinary circumstances to be easily had.

The instructions as recommended and issued by the National Lifeboat Institution are now accepted as the most practicable and certain methods yet adopted, and we think we cannot do better than give them *in extenso*.

I.

Send immediately for medical assistance, blankets, and dry clothing, but proceed to treat the

PLATE XVII.

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patient *instantly* on the spot, in the open air, with the face downwards, whether on shore or afloat; exposing the face, neck, and chest to the wind, except in severe weather, and removing all tight clothing from the neck and chest, especially the braces.

The points to be aimed at are—first and *immediately*, the RESTORATION OF BREATHING; and secondly, after breathing is restored, the PROMOTION OF WARMTH AND CIRCULATION.

The efforts to *restore Breathing* must be commenced immediately and energetically, and persevered in for one or two hours, or until a medical man has pronounced that life is extinct. Efforts to promote *Warmth* and *Circulation* beyond removing the wet clothes and drying the skin must not be made until the first appearance of natural breathing. For if circulation of the blood be induced before breathing has recommenced, the restoration to life will be endangered.

II.

TO RESTORE BREATHING.

TO CLEAR THE THROAT—Place the patient on

the floor or ground with the face downwards, and one of the arms under the forehead, in which position all fluids will more readily escape by the mouth, and the tongue itself will fall forward, leaving the entrance into the windpipe free. Assist this operation by wiping and cleansing the mouth.

If satisfactory breathing commences, use the treatment described below to promote Warmth. If there be only slight breathing—or no breathing or if the breathing fail, then—

To Excite Breathing—Turn the patient well and instantly on the side, supporting the head, and

Excite the nostrils with snuff, hartshorn, and smelling salts, or tickle the throat with a feather, &c., if they are at hand. Rub the chest and face warm, and dash cold water, or cold and hot water alternately, on them.

If there be no success, lose not a moment, but instantly—

To Imitate Breathing—Replace the patient on the face, raising and supporting the chest well on a folded coat or other article of dress.

Turn the body very gently on the side and a

PLATE XVIII.

little beyond, and then briskly on the face, back again; repeating these measures cautiously, efficiently, and perseveringly about fifteen times in the minute, or once every four or five seconds, occasionally varying the side.

[*By placing the patient on the chest, the weight of the body forces the air out; when turned on the side, this pressure is removed, and air enters the chest.*]

On each occasion that the body is replaced on the face, make uniform but efficient pressure with brisk movement, on the back between and below the shoulder-blades or bones on each side, removing the pressure immediately before turning the body on the side. During the whole of the operations let one person attend solely to the movements of the head, and of the arm placed under it.

[*The first measure increases the Expiration, the second commences Inspiration.*]

The result is *Respiration or Natural Breathing;* —and if not too late, *Life.*

Whilst the above operations are being proceeded with, dry the hands and feet; and as soon as dry clothing or blankets can be procured, strip the body and cover, or gradually reclothe it, but taking

care not to interfere with the efforts to restore breathing.

III.

Should these efforts not prove successful in the course of from two to five minutes, proceed to imitate breathing by Dr Silvester's method, as follows:—

Place the patient on the back on a flat surface, inclined a little upwards from the feet; raise and support the head and shoulders on a small firm cushion or folded article of dress placed under the shoulder-blades.

Draw forward the patient's tongue, and keep it projecting beyond the lips: an elastic band over the tongue and under the chin will answer this purpose, or a piece of string or tape may be tied round them, or by raising the lower jaw, the teeth may be made to retain the tongue in that position.

To Imitate the Movements of Breathing —Standing at the patient's head, grasp the arms just above the elbows, and draw the arms gently and steadily upwards above the head, and *keep them stretched* upwards for about two seconds. [*By this*

PLATE XIX.

means air is drawn into the lungs.] Then turn down the patient's arms and press them gently and firmly for about two seconds against the sides of the chest. [*By this means air is pressed out of the lungs.*]

Repeat these measures alternately, deliber and perseveringly, about fifteen times in a minute, until a spontaneous effort to respire is perceived, immediately upon which cease to imitate the movements of breathing, and proceed to INDUCE CIRCULATION AND WARMTH.

IV.

TREATMENT AFTER NATURAL BREATHING HAS BEEN RESTORED.

TO PROMOTE WARMTH AND CIRCULATION—Commence rubbing the limbs upwards, with firm grasping pressure and energy, using handkerchiefs, flannels, &c. [*By this measure the blood is propelled along the veins towards the heart.*]

The friction must be continued under the blanket or over the dry clothing.

Promote the warmth of the body by the applica

tion of hot flannels, bottles, or bladders of hot water, heated bricks, &c., to the pit of the stomach, the arm-pits, between the thighs, and to the soles of the feet.

If the patient has been carried to a house after respiration has been restored, be careful to let the air play freely about the room.

On the restoration of life, a teaspoonful of warm water should be given; and then, if the power of swallowing have returned, small quantities of wine, warm brandy and water, or coffee, should be administered. The patient should be kept in bed, and a disposition to sleep encouraged.

GENERAL OBSERVATIONS.—The above treatment should be persevered in for some hours, as it is an erroneous opinion that persons are irrecoverable because life does not soon make its appearance, persons having been restored after persevering for many hours.

APPEARANCES WHICH GENERALLY ACCOMPANY DEATH.—Breathing and the heart's action cease entirely; the eyelids are generally half-closed; the pupils dilated; the jaws clenched; the fingers semi-contracted; the tongue approaches to the under

PLATE XX.

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edge of the lips, and these, as well as the nostrils, are covered with a frothy mucus.

Coldness and pallor of surface increase.

CAUTIONS.

Prevent unnecessary crowding of persons round the body, especially if in an apartment.

Avoid rough usage, and do not allow the body to remain on the back unless the tongue is secured.

Under no circumstances hold the body up by the feet.

On no account place the body in a warm bath, unless under medical direction, and even then it should only be employed as a momentary excitant.

CONCLUSION.

Ornamental Swimming and feats under water are matters of time, patience, and perseverance, and no printed instructions, however plain, can to any great extent help the learning of these advanced branches of swimming. The great object to be aimed at is to attain proficiency in the Breast, Side, and Over-hand strokes, Swimming on the back, Floating, Sculling, Treading, Diving, &c., as shown in the earlier portions of this work. With a thorough knowledge of these plain movements, the pupil will find it quite an easy matter, by combining the one with the other, to perform such tricks in the water, as for instance, to swim like a dog, or like a frog, play pick a back, spin like a top, revolve, and by attention to breathing to lie at the bottom of the water in positions.

These and many other apparently difficult feats are neither more nor less than combinations of the

plain movements. When practising the more difficult parts of swimming, the pupil will do well to make himself thoroughly acquaint with the "feel" of the water, as it is called, that is, to ascertain to a nicety the effect which every movement of any of the limbs, no matter how slight, has over the motion of the whole, or any part of the body. Our object, however, has all along been to offer such instructions in as plain language as we could command, to enable almost any one to attain tolerable proficiency in the most useful branches of the art.

The foregoing instructions have been written in as nearly as possible the same words as we use every day when teaching. We think those pupils who have been under our care will recognize this throughout, and the fact that hundreds have been taught by us on these principles may perhaps serve as our justification in laying them before that class of the general public who take an interest in this particular branch of physical education.

And now, in drawing to a close, we may be allowed to add that if the lessons given in this book shall prove the means of helping any to swim,